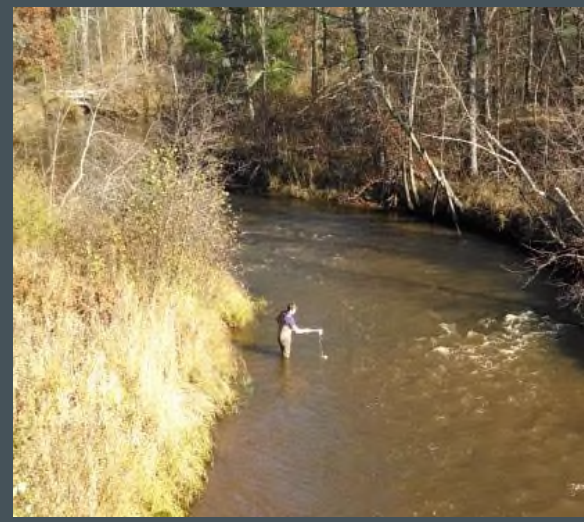
VOLUNTEER TOTAL PHOSPHORUS MONITORING PROGRAM

WATER ACTION VOLUNTEERS (WAV) STREAM MONITORING



LINDSEY ALBRIGHT AND KRIS STEPENUCK
ILANA HAIMES AND TIM ASPLUND

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WISCONSIN
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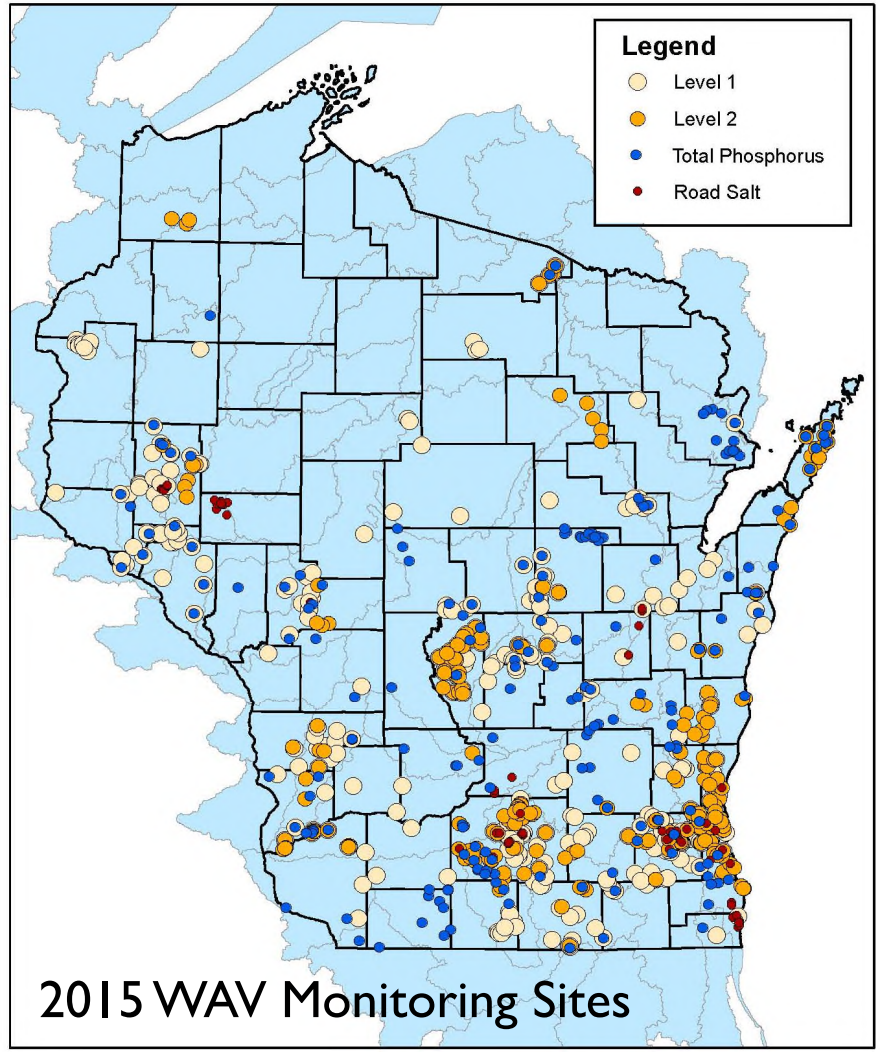
WAV PROGRAM OVERVIEW

- Supported by:
  - Wisconsin Department of Natural Resources (WDNR)
  - University of Wisconsin-Extension (UWEX)
- Three Monitoring Levels
  - Level 1
    - Educational
  - Level 2
    - Status and Trends
  - Level 3
    - Road Salt
    - Total Phosphorus



2015 WAV Monitoring Sites

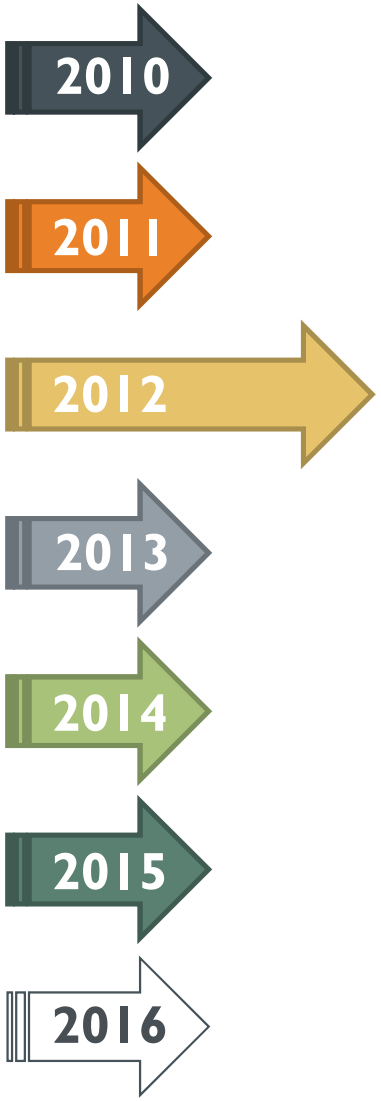
PROGRAM GOALS

- Support WDNR efforts to assess in-stream phosphorus levels across the state
  - Characterize the total phosphorus concentrations most commonly occurring in the streams
  - Primary algae and aquatic plant "growing season"
- Engage WAV Stream Monitors in the sampling process to help alleviate biologist workload
  - More data is needed to assess water quality on a widescale basis

PROGRAM TIMELINE

- Developed the Wisconsin's Consolidated Assessment and Listing Methodology (WisCALM) document
  - Established numeric criteria for in-stream phosphorus levels
- Began monitoring streams across the state to collect the necessary data to develop impaired waters lists

PROGRAM TIMELINE

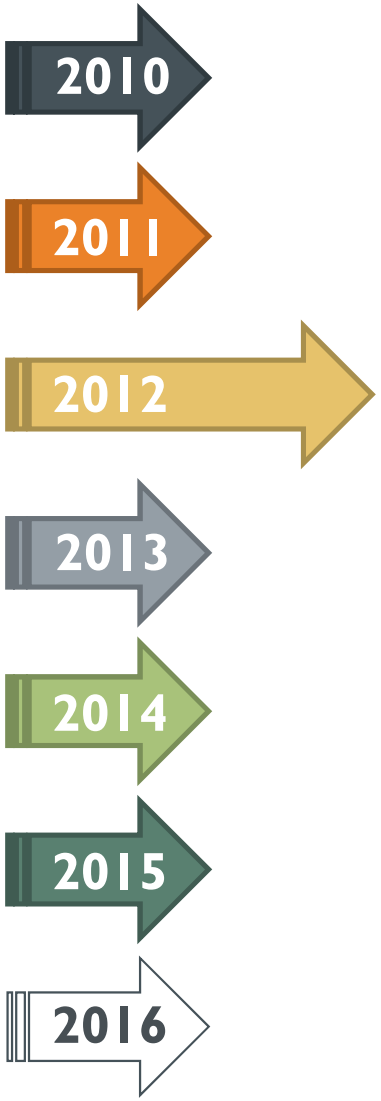


- WAV staff worked with the WDNR Streams Technical Team to develop:
  - Methods for WAV volunteers to follow when collecting water samples
  - Volunteer training plan
  - Quality Assurance Project Plan

SAMPLING METHODOLOGY

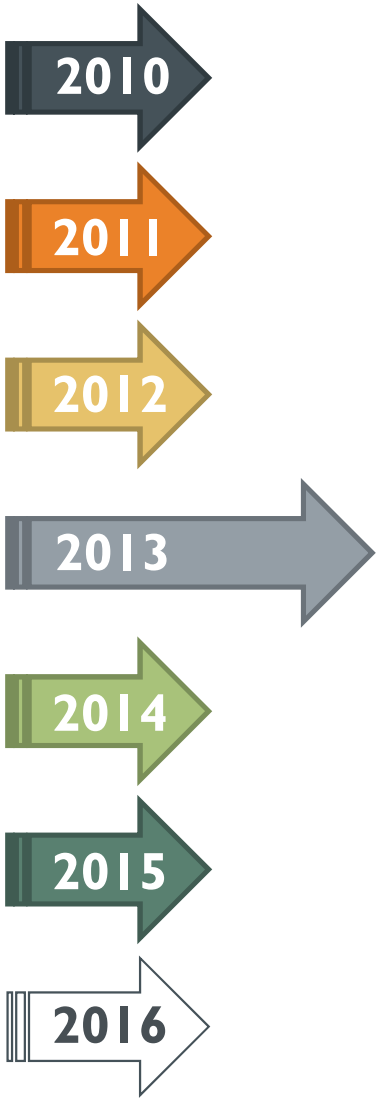
- Water samples are collected:
  - ❑ May through October
  - ❑ Approx. 30 days apart
- Provided with sampling pole for safety
- Acid preservative added to sample
- Shipped on ice to WSLH
- QA/QC at 10% of sites

PROGRAM TIMELINE



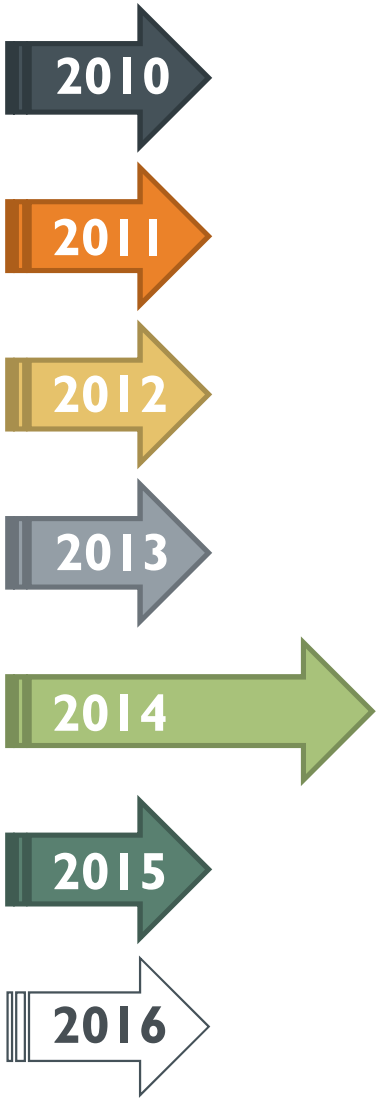
- WAV staff worked with the WDNR Streams Technical Team to develop:
  - Methods for WAV volunteers to follow when collecting water samples
  - Volunteer training plan
  - Quality Assurance Project Plan
- **12 sites were monitored with 100% success**

PROGRAM TIMELINE



- WDNR selected monitoring sites
  - **76 sites were monitored – 100% success**
- Funding available for volunteer-selected sites
  - **40+ sites were monitored – 100% success**
- Local groups first started to obtain grants to support phosphorus monitoring at local WAV sites

PROGRAM TIMELINE



- WDNR selected monitoring sites
  - **98 sites were monitored – 99.5% success**
  - WAV volunteer support saved WDNR $22,600
- No WAV selected sites monitored
- Local groups obtain grants to support monitoring
  - Over $47,000 in monitoring and shipping costs

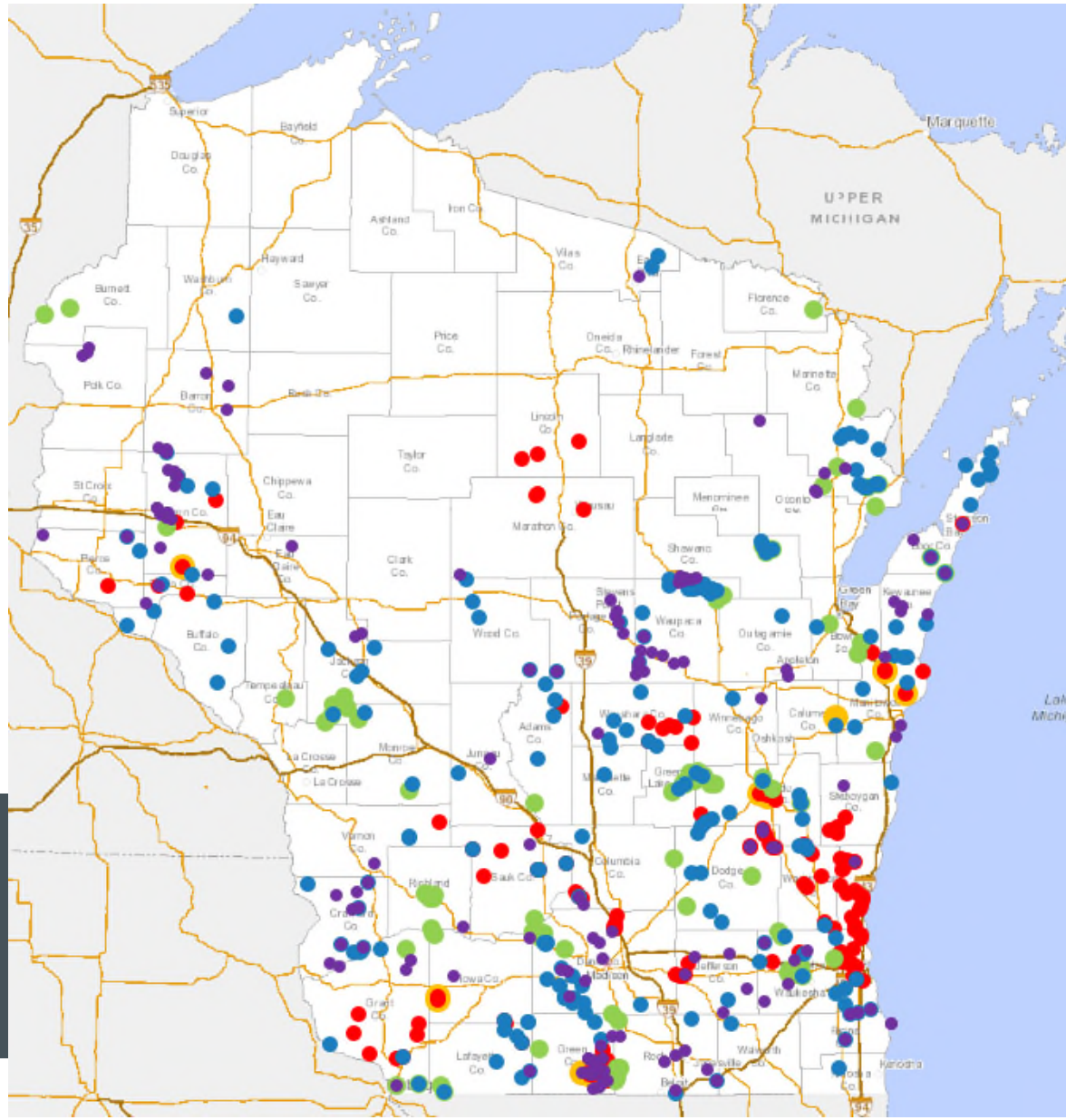
PROGRAM TIMELINE

- WDNR selected monitoring sites
  - **107 sites were monitored – 99.5% success**
- Funding available for volunteer-selected sites
  - **86 sites were monitored – 99.6% success**
- Local groups obtain grants to support monitoring
  - **Over 75 sites around the state**

PROGRAM TIMELINE

- WDNR selected monitoring sites
  - **92 sites are being monitored**
- Funding available for volunteer-selected sites
  - **50 sites are being monitored**
- Local groups obtain grants to support monitoring
  - **Over 80 sites around the state**

TOTAL PHOSPHORUS MONITORING SITES



Monitoring Year

- 2012
- 2013
- 2014
- 2015
- 2016

KEY CONSIDERATIONS FOR PROGRAM

- Concise methodology and clear expectations
- Communication, communication, communication!
  - Follow up with volunteers
  - Communication about lab results
  - End of season survey
  - Monitoring reports

MONITORING REPORTS

Water Action Volunteers

2015 Total Phosphorus Monitoring Program

TP Criteria Exceeded

Kickapoo River - Station 7 old dam foundation at park in Wilton

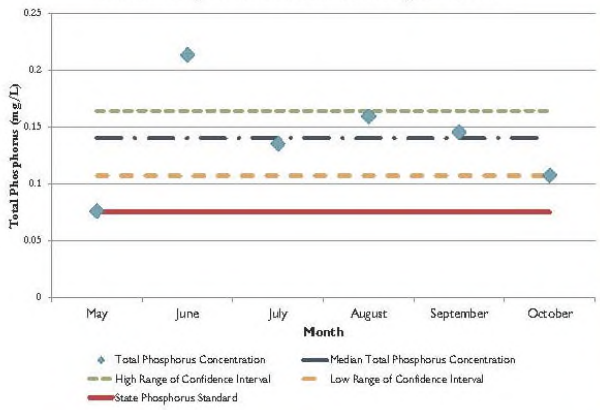
Lindsey Albright and Bryan Pierce

Monitoring Site Quick Facts	
SWIMS Station ID	10014266
WBIC	1182400
County	Monroe
Watershed	Upper Kickapoo River
Watershed Area	117.33 sq miles
Total Stream Miles	267.92
Downstream Waterbody	Wisconsin River

2015 Monitoring Results	
Minimum TP Value	0.0757 mg/L
Maximum TP Value	0.213 mg/L
Median TP Value	0.140 mg/L
No. Samples > 0.075mg/L	6

Map Legend ★ - Sampling Location for 2015

Total Phosphorus Concentration per Month



Currently, there is a patchwork of stream reaches on the Black, Trempealeau, and Kickapoo Rivers that are listed as impaired due to total phosphorous levels. In order to fill some of the data gaps found along unmonitored river stretches of western Wisconsin, local WAV volunteers were asked in 2015 to collect six growing season water samples at three sites on the Trempealeau River, four sites on the Black River, and four sites on Kickapoo River.

Why Phosphorus?

Phosphorus is an essential nutrient responsible for plant growth, but it is also the most visible, widespread water pollutant in Wisconsin lakes. Small increases in phosphorus levels can bring about substantial increases in aquatic plant and algae growth, which in turn can reduce the recreational use and aquatic biodiversity When the excess plants die and are decomposed, oxygen levels in the water drop dramatically which can lead to fish kills.

Additionally, one of the most common impairments in Wisconsin's streams is excess sediments that cover stream bottoms. Since phosphorus moves attached to sediments, it is intimately connected with this source of pollution in our streams. Phosphorus originates naturally from rocks, but its major sources in streams and lakes today are usually associated with human activities: soil erosion, human and animal wastes, septic systems, and runoff from farmland or lawns. Phosphorus-containing contaminants from urban streets and parking lots such as food waste, detergents, and paper products are also potential sources of phosphorus pollution from the surrounding landscape. The impact that phosphorus can have in streams is less apparent than in lakes due to the overall movement of water, but in areas with slow velocity, where sediment can settle and deposit along the bottom substrate, algae blooms can result.

Photo credits to Matt Berg, David Seligman, Linda Warren, Adrian Konell, and Lindsey Albright (front)

Volunteer Monitoring Protocol

To assess in stream phosphorus levels, WAV volunteers collected water samples that were analyzed for total phosphorus (TP) at the State Lab of Hygiene during the growing season (May through October). Following Wisconsin Department of Natural Resources (WDNR) methods, six phosphorus water samples were collected at each monitoring site - one per month for each of the six months during the growing season, The water samples were collected approximately 30 days apart and no samples were collected within 15 days of one another.

A stream site is considered "impaired" if: 1) the lower 90% confidence limit of the sample median exceeds the state TP criterion of 0.075 mg/L or 0.1 mg/L or 2) there is corroborating WDNR biological data to support an adverse response in the fish or macroinvertebrate communities. If there is insufficient data for either of these requirements, more data will need to be collected in subsequent years before an impairment decision can be made. A site is designated as a "watch water" if the median total phosphorus concentration falls within the confidence limit and a site is considered to have "met criteria" is the upper limit of the confidence interval does not exceed the criterion.

TP Criteria Exceeded

Watch Waters

TP Criteria Met

PROJECT PARTNERS

WISCONSIN DEPT. OF NATURAL RESOURCES

Water Action Volunteers

ERC Environmental Resources Center

UW Extension University of Wisconsin-Extension

KEY CONSIDERATIONS FOR PROGRAM

- Concise methodology and clear expectations
- Communication, communication, communication!
  - Follow up with volunteers
  - Communication about lab results
  - End of season survey
  - Monitoring reports
- Training resources for the volunteers
  - Online TP monitoring quiz for returning volunteers
  - WAV monitoring videos

BENEFITS TO VOLUNTEER ENGAGEMENT

For WDNR

- Money and time savings for staff
  - Lots of data for little $
- More eyes on the ground throughout the state
- Increased volunteer/DNR staff interaction

For WAV monitors

- Expanded WAV monitoring program
- Collecting useful data
- Increased engagement in the WAV program as a whole
  - Increased knowledge about their WAV site(s)

Water Action Volunteers

UW Extension
University of Wisconsin-Extension

WISCONSIN DEPT. OF NATURAL RESOURCES

ENVIRONMENTAL RESOURCES CENTER

ACKNOWLEDGMENTS

QUESTIONS?

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